Transportation Team

2019 Midterm Report

Team Leaders:

Maddie Jordan

Brooke Shimasaki

Team Members:

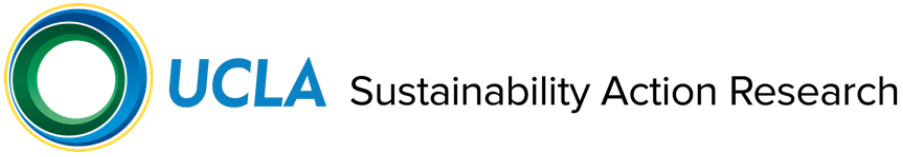
Natalie Gonzalez

Anna Weir

Kyle Willenborg

Stakeholder:

Jimmy Tran, UCLA Active Transportation Planner



ABSTRACT

Electric scooters (e-scooters) are one of the newest forms of sustainable transportation at UCLA. While they allow students to move efficiently on and around campus with minimal carbon emissions, there are still logistical elements, such as parking locations and ride lanes, that need to be considered. Furthermore, in order to better understand and support this sustainable mode of transportation while still being mindful of overall campus safety, the Sustainability Action Research Transportation team plans to conduct attitude surveys, spot count assessments, and a campaign to promote safe e-scooter use over other unsustainable modes of transportation. Attitude surveys will aim to uncover student motivations for using e-scooters, as well as gauge their compliance concerning specific parking locations. The spot count assessment will help identify trends in ridership, as well as assess the use of current e-scooter parking infrastructure. Finally, our campaign will focus on the environmentally and financially sustainable component of e-scooters as compared to ride-hailing services like Lyft and Uber. The ways in which we attempt to engage the UCLA campus population in this campaign will be informed by results from our survey. We ultimately will aim to make students and staff aware of how to safely and efficiently choose e-scooters as an alternative form of transportation by providing an online web mapping platform with the physical geographic location of parking areas we survey.

INTRODUCTION

UCLA Transportation Plan Background

UCLA's hustling and bustling campus community consists of students, faculty, administrative staff, medical staff, researchers, alumni, and visitors of the public. Over 77,000 people making their way onto campus every day via various modes of transportation including active transportation, public transit, ride-hailing, and private automobile. Overall, about 62,657

students, faculty, and staff commute to campus each day; this means that about 80% of UCLA's total population is commuting. On a positive note, about 63% of commuters come to campus via a sustainable mode like vanpool, public transit, active transportation, Bruin Bus, or ride-hailing (UCLA Transportation 2019). Due to a combination of Los Angeles' increased traffic congestion and the various transportation services offered by UCLA, more community members are choosing sustainable transportation over person automobiles.

In order to accommodate the university community's needs in a safe, efficient, and environmentally conscious manner, UCLA's Sustainable Transportation Plan was created. It works in tandem with existing commitments and programs such as UC Sustainability Policy, 2025 UC Carbon Neutrality, and the American College and University Presidents' Climate Commitment. The framework of the Sustainable Transportation Plan is based in a triple bottom line, striving to balance fiscal performance with consumer demands and environmental forethought. As the campus community expands and the prioritization of parking lots for private automobiles decreases, UCLA Transportation is faced with the challenge of providing and supporting diverse modes of transportation, specifically keeping in mind the needs of commuters as well as on and near campus mobility (UCLA Transportation 2019). This year's Sustainable Action Research Transportation Team strives to work in conjunction with UCLA Transportation to understand current transportation trends, specifically in regards to e-scooters, and then identify potential strategies that can help the campus more effectively continue to reach green goals.

On and Near Campus Transportation

Concerning on and near campus mobility, UCLA Transportation strives to accommodate transportation for those living in about a one mile radius from campus. Common modes of transportation include Bruin Bus, active modes (like walking and biking), ride hailing, and

electric scooters. Implementing infrastructure that promotes active modes of transportation is an effective way of promoting community health, while reducing traffic congestion around the campus. Additionally, a replacement of intra-campus ride hailing with active modes, Bruin Bus, or personal mobility devices may be another way to ease traffic on campus while promoting more green alternatives.

It is no surprise that active transportation options like walking and bicycling are the most sustainable ways to travel from one place to another. Active transportation only requires the physical activity of a human being—excess energy, such as gas, is not required. Infamous for its car culture and bad air quality, the city of Los Angeles should definitely work to promote active transportation. UCLA recognizes this, and in the past few years has made strides to incentivize active transportation among students and faculty. One big step taken in 2017 was launching UCLA's Bruin Bike Share, which has 130 bikes at 18 hub locations throughout campus and Westwood Village. In the first month alone, five-hundred members joined. The Earn-A-Bike program, which offers a free bicycle to eligible employees and graduate students who have chosen to give up their parking permits for two years, also continued throughout 2017. Reportedly, three hundred participants were enrolled (UCLA Transportation 2017). While data is not available for the most recent year, it likely that enrollment in these programs continued to grow throughout 2018. This can be inferred as UCLA even began redesigning infrastructure on and around campus to support both pedestrians and cyclists. Some efforts have included narrowing several main roadways, installing medians, adding more emerald green bike lanes, and reducing the speed limit on campus to 20 mph.

The alignment between health benefits that arise with using modes of active transportation, and the UCLA Healthy Campus Initiative are also another incentive to be

considered when progressing UCLA towards its sustainable transportation goals (UCLA Transportation 2017). The main factors that affect the overall health benefit of switching to a mode of active transportation are as follows: fewer deaths from air pollution exposure, less opportunity for traffic fatalities, and an increase in active lifestyles. When examining the effect a 40% shift from car rides to bicycle rides within Barcelona City had, we can see that there was a total of 66.12 deaths avoided, where the increase in physical activity accounted for nearly all of the decrease in deaths (Rojas-Rueda 2012). If we shift our focus back to the United States, we can see there are an approximate 200,000 deaths every year stemming from inactive lifestyles. There is no doubt that a car-centric culture in Los Angeles, surely engenders this significant public health challenge for the American population (UCLA Transportation 2019). Although a vast majority of those deaths come from people much older than the typical college student, other studies show that there is a positive correlation between exercise and academic success (Trockel 2000). There are also numerous studies which show a decrease in depression that directly correlates to an increase in physical activity (O'Neal 2000). The verdict is clear; active modes of transportation to or around campus increases physical activity level and this has all sorts of positive health benefits for its participants.

New Developments in Near Campus Transportation

As companies like Uber and Lyft have grown in widespread popularity and use, so has the use of these services on and around campus. With over 90,000 pickups and drop-offs per week, ride-hailing has become a convenient way for UCLA students and faculty to make their way to or around campus. Recently there are raising concerns about the environmental impact of unnecessary trips though, as students alone call about 11,000 Uber and Lyft rides that never actually leave campus every week (Kidambi 2019). The current plan is to convert any solo ride

hailing trips into pooling trips, and this has been incentivized by partnering with ride-hailing companies to ensure a fixed, flat-rate price of $4.99 for any shared ride on or around campus. The idea to economically motivate users of ride-hailing services by charging a larger fee for solo trips when compared to carpooled trips has been suggested for the future.

When looking toward the future of near campus transportation, no mode of transportation seems as rapidly growing as the widely available e-scooters. Bird, Lime, and other scooter companies have provided a somewhat cheap and convenient way to travel from one end of campus to the other. With an initial base charge of $1.00 and a rate of $0.15 per minute, birds can cruise around campus at around 15 mph (Carter 2018). With a recent slow-down zone installed on Bruin Walk (Coneeny 2018), it is expected that the use of Birds on campus will decrease but no studies have been done on the use of birds. It will be interesting to see whether the use of e-scooters could potentially replace the more environmentally harmful ride sharing, or if they will be used in place of other modes of active transportation, like walking. Data first needs to be collected before any meaningful conclusions can be drawn.

METHODOLOGY

This leads us to the actions we took this quarter to better understand e-scooter usage around campus, and to assess the effectiveness of the e-scooter parking locations. We begin with a brief discussion on the spot counts we performed and what they entailed. The spot counts were our method for collecting data on the activity of the e-scooter parking locations and other e-scooter hotspots. Measurements were taken on Tuesday, Wednesday, and Thursday once in the morning, around 8:00 a.m. - 11:00 a.m., and once in the evening, around 3 p.m. - 6 p.m. There were six different locations recorded during each measurement period, four of which were e-scooter parking locations and the remaining two were areas we deemed e-scooter hotspots (see

appendix 6). The method for recording the actual data was simple. For the parking spot locations, we counted the number of e-scooters in the parking spot, as well as the number of e-scooters within the area of the parking spot. We also made sure to note if any e-scooters were haphazardly or dangerously parked (see appendix 1). For the hotspots areas, we simply counted the total, also again making sure to take note of any haphazard parking. You can see the results of the data below in Appendix 5.

The main purpose of the spot counts at the parking spot locations was to gauge the activity level of the current parking structures in place, and hypothesize possible reasons for their successes or failures. We also looked at the hotspots to scout potential locations for future e-scooter parking structures. According to our data collected from the spot counts, the parking structures were critically underused over the course of our 3-week measurement period. Each parking location averaged from 1.5 to 5 total e-scooters at each location per spot count, but also averaged less than .5 e-scooters inside each e-scooter parking structure per spot count. One of the parking locations was only used once during our entire data collection. We can compare this with the hotspots, which averaged from 12.33 to 15 e-scooters per spot count.

Our team has developed two possible main reasons for the underuse of the e-scooter parking lots. The first of which is location. All of the e-scooter parking lots are located on the way but never at a possible destination where one might end their e-scooter ride. Because they are in such inconvenient locations, we believe no one feels the need to stop their e-scooter ride early to use the e-scooter parking lot. The other reason is awareness of the parking spot. The e-scooter parking spots are not very visible at all, often times hidden near a bush or behind a building. There isn't even a physical structure to indicate that birds should be parked there, only a painting on the sidewalk. This is extremely ineffective for spreading awareness of the parking

spots and encouraging their use. E-scooter parking spots will play an important role in increasing the safety of e-scooters as a sustainable method of transportation on campus, and we must strive to improve their locations and visibility if we expect them to be used frequently.

The second way our team will be assessing e-scooter usage on our campus will be through an online survey. We wanted to put out a survey in an effort to understand the attitude towards the new mode of transport with the hope of using this data to inform our campaign that we will be launching in Spring. When we were first developing our survey, we had a long list of questions that we wanted to include on it. While we wanted to collect as much data as possible by including many detailed questions, we decided it would be best to make our survey short in order to maximize the amount of people that would complete and submit it. We narrowed down our questions to include only the ones we considered the most useful for our project. We determined this by considering what information we would need in order to make our campaign effective. When our survey was finished we sent it to our stakeholder for approval, but before we got the chance to send it out we were met with a challenge that forced us to rework our survey. We finally sent out our survey to a small portion of UCLA's campus at the beginning of week 10, and plan to send it out to more people at the beginning of Spring quarter.

Our survey is composed of two pages of questions. On the first page, the survey taker will be prompted to answer a demographic question, a question that asks them what factors they take into consideration when choosing a mode of transport, and the last question asks them whether or not they use e-scooters on our campus. The questions on the second page are dependent on their answer to that last question. If they answered yes, then the second page will have questions specific to their use of e-scooters. We chose questions that would allow us to quantify and qualify their e-scooter usage by asking questions such as how long their average

ride is and what motivates them to use e-scooters. If they answered no, then the second page asks them the main reason that they don't use e-scooters and what is their preferred mode of transport.

We designed our survey to be applicable to every person on our campus, regardless of whether or not they use e-scooters. Of the responses we have so far, only 24.4% (see appendix 5) of survey takers use e-scooters. By having the yes and no option that determines the next set of questions we are able to maximize the amount of data that we collect from our survey. Our goal is to better understand people's motivation as to whether or not they use e-scooters and we will be using this information to encourage e-scooter use over unsustainable alternatives such as ride-hailing.

CHALLENGES AND DIFFICULTIES

We experienced some difficulties during the course of our project, a few of which stem from our status as a relatively young Sustainability Action Research group. We had no previous work to build upon, so found ourselves quite lost in preliminary planning stages as we could not determine an appropriate scope for our project. We wanted to make an impactful difference on campus and influence how the campus community views e-scooters, but were unsure as to how we could balance this with the goals of the Transportation Department. The department was primarily interested in collecting data to assess the effectiveness of their newly established parking locations, while we hoped to start a campaign to change campus-wide attitudes towards e-scooter use. We soon realized that a long-term campaign would be unrealistic as we would need to apply for a grant, collect data, implement the campaign, and conduct follow-up research to assess the effectiveness of the campaign all in a relatively short time (20-week timeframe). We resolved this by agreeing amongst ourselves to create a small-scale campaign of infographics

focused on a specific target audience, as we all shared a goal of wanting to use our data to make a difference on campus.

Working exclusively with the Transportation Department was beneficial as we did not have to navigate the complex bureaucracy of inter-departmental communication. However, we did experience difficulties associated with communicating within the department as they had a number of different projects to do with e-scooters running simultaneously with no singular person or team coordinating them. One of these projects was the placement of temporary plastic 'scooter and bicycle parking' a-frame signs around e-scooter hotspots (see appendix 2), which began appearing a week into our spot counts. While these were not as permanent as the e-scooter parking zones we were studying, they may have had skewed our spot count data. Some of these signs pointed towards the official parking locations, while others told riders to park in unused alcoves or patches of soil (see appendix 2). Other signage advised riders to park e-scooters in nearby bike racks (see appendix 3). We realized that this made it difficult to collect data on how the well the UCLA community utilizes e-scooter parking spots as even if a rider obeyed signage and parked by an a-frame sign or bike rack, we had to count it as being 'outside the parking spot' as it was technically outside the official spay-painted spots we were focused on. However, our data can still be used to show whether the spray-painted demarcations are effective and whether it would be useful to additionally use the a-frame signs to clearly advertise parking spots.

We had a few other difficulties in data collection associated with conducting our spot counts. We initially wanted to do a sit-and-wait style observational count of all scooters passing a particular area in a given period of time to collect information about e-scooter traffic along different routes, but time constraints meant we could not feasibly conduct many counts using this method. After listening to advice from our stakeholder, we instead decided to count the number

of parked scooters in different locations at specific periods of time in order to create a 'snapshot' of peak periods for e-scooter use. This method meant we could increase the number of counts per week and locations surveyed, benefiting our overall project in the long run. Our lack of expertise also meant we had to learn from our mistakes as we progressed. We were two weeks into our spot counts before there was a day of torrential rain, and the numbers of e-scooters at each location dropped significantly. We then realized we needed to note down extraneous variables, such as the weather, in our spot count data sheets. As we go into Spring quarter we will also need to account for campus-wide events such as holidays, employee strikes, and graduation ceremonies as they will no doubt impact the number of e-scooters recorded.

We also realized that one of our primary assumptions, that the number of e-scooters in each parking spot reflects the degree to which the community responds to parking signage, may have been rather reductionary. After conducting counts for a few weeks, we noticed some trends in parking styles; sometimes there would be many scooters stacked uniformly in a spot (see appendix 4), suggesting they were placed there by e-scooter company employees who were dropping them off after charging. While we initially thought of this as a setback as it complicated our analysis of the parking location effectiveness, we see that this may be beneficial for our project as our data could now be used by both the Transportation Department and e-scooter companies to create specific drop off spots around campus. This would reduce the number of stray e-scooter clumps and maximize their accessibility in locations where they are utilized most.

Lastly, one of the biggest unforeseen setbacks we experienced as a group was the emergence of the Sustainable LA Grand Challenges Transportation Team, who are also studying e-scooter activity. We were taken aback when the team sent out a survey on e-scooter rider attitudes the day before ours was scheduled to be released, and the high degree of overlap

between our drafted questions and theirs made us unsure of how we could continue. We had to reconsider our entire project scope and rewrite our attitude survey during Week 9. Thus, we could not accumulate enough survey data to include substantial analysis in our midterm presentation. However, after communicating with our stakeholder and members of the Grand Challenges team we were able to find enough differences between our overall objectives and goals to allow us to continue with our initial project. However, this will be an ongoing challenge throughout our research, and our group will have to improve communication with the Grand Challenges team in order to minimize any project overlap as we progress into our campaign.

SPRING QUARTER AND CONCLUSION

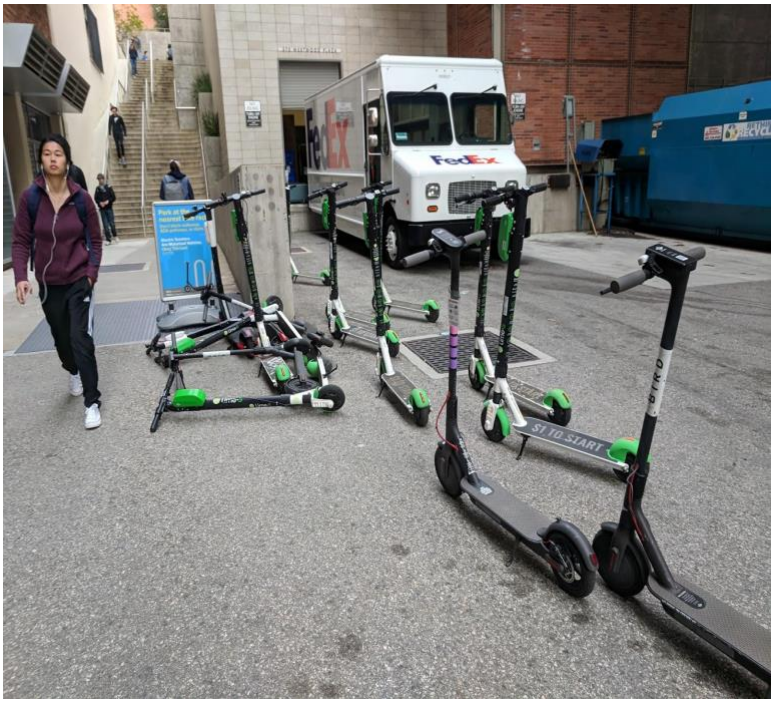
Spring quarter plans include continuing data collection as well as creating and dispersing an educational campaign. Firstly, we will continue the spot counts at our six-designated location until Spring quarter Week 5 (May 2). Although the Transportation Department plans to implement new parking locations and remove some current, less effective parking areas, our team will continue reporting data for our chosen locations in order to have consistent data. Additionally, we will continue advertising our attitude survey until Week 4 through departmental list serves, personal social media accounts, and in-person tabling. Once our survey is closed, the team will start to create an informational campaign, detailing the environmental, economic, and safety advantages of using e-scooters. Based on the mean trip length gathered from our survey, our team will then average CO_2 emissions from the average e-scooter trip, and compare it to the CO_2 emissions for the average automobile trip. Additionally, we will compare the price for an average e-scooter trip to the average price of a ride-hailed trip. Our campaign's emphasis will be based on the data we collect from the attitude survey – specifically the questions concerning what is the greatest motivator when choosing a mode of transportation. We will create various

infographics to display our findings, sharing some of the infographics with UCLA Transportation Department and printing others on small flyers. We hope to obtain a small TGIF grant that will fund the printing of professional fliers of high quality. The team will flyer for the last two weeks of Spring quarter, concluding our project.

UCLA's large campus community is comparable to that of a small city. Therefore, green initiatives implemented on campus act as models for not only other universities, but also the greater Los Angeles area. Sustainable transportation is an important aspect that the campus must focus on because all community members – whether that be students, faculty, or staff – must make their way to and from campus on a near daily basis. This means that green practices have the potential to impact the choices of thousands of people each day. The SAR Transportation Team strives to influence the community's transportation decisions, emphasizing the practicality and efficiency of dockless, e-scooter use.

APPENDICES

Appendix 1: Examples of unsafe e-scooter parking

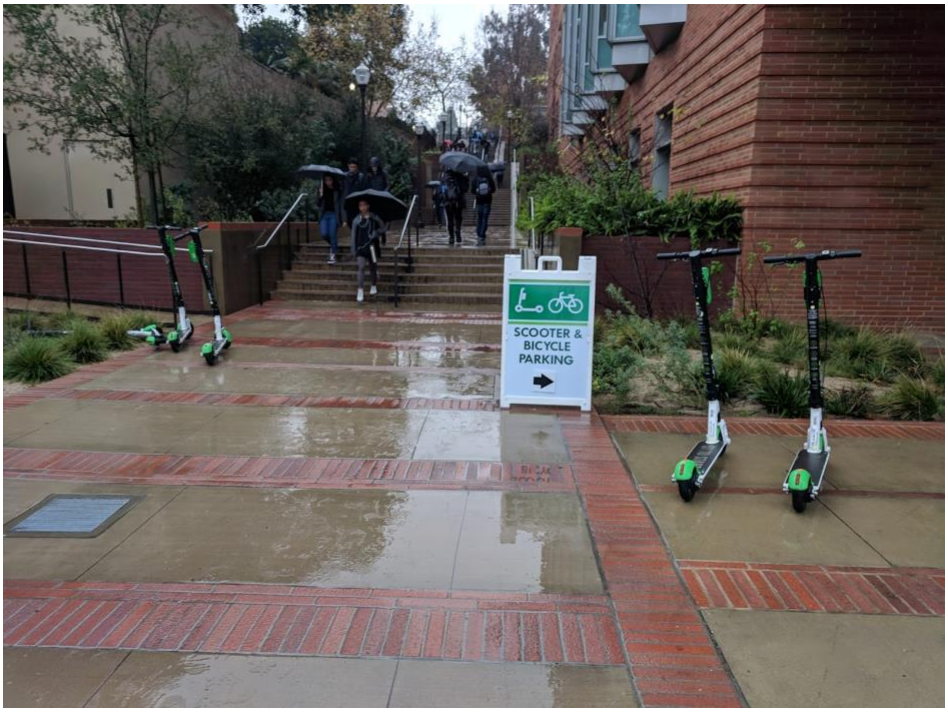


Scooters blocking the loading dock next to the Boelter stairs, despite signage saying not to. Taken at Boelter stairs.

E-scooters parked unsafely by being placed on benches. Taken outside Public Affairs building.

Fallen over scooters were considered unsafe parking. Taken across the road from the Scramble Crosswalk parking location.

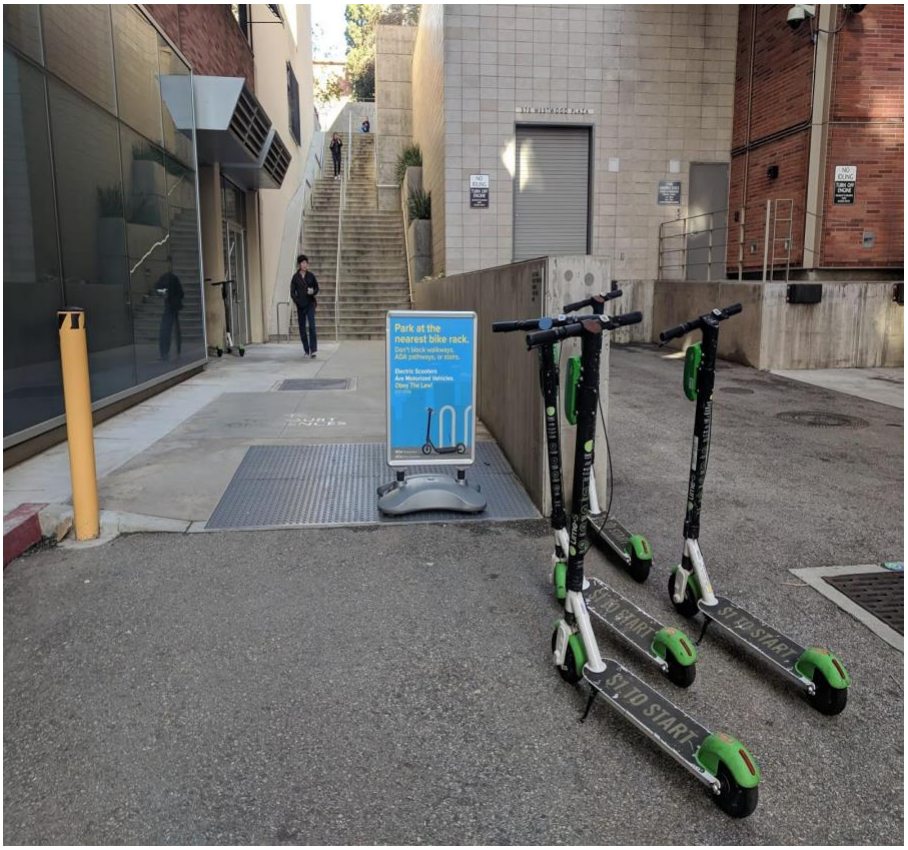
Appendix 2: Temporary a-frame signs



An a-frame sign telling riders to park in an empty alcove. Taken at Luskin Turnaround.

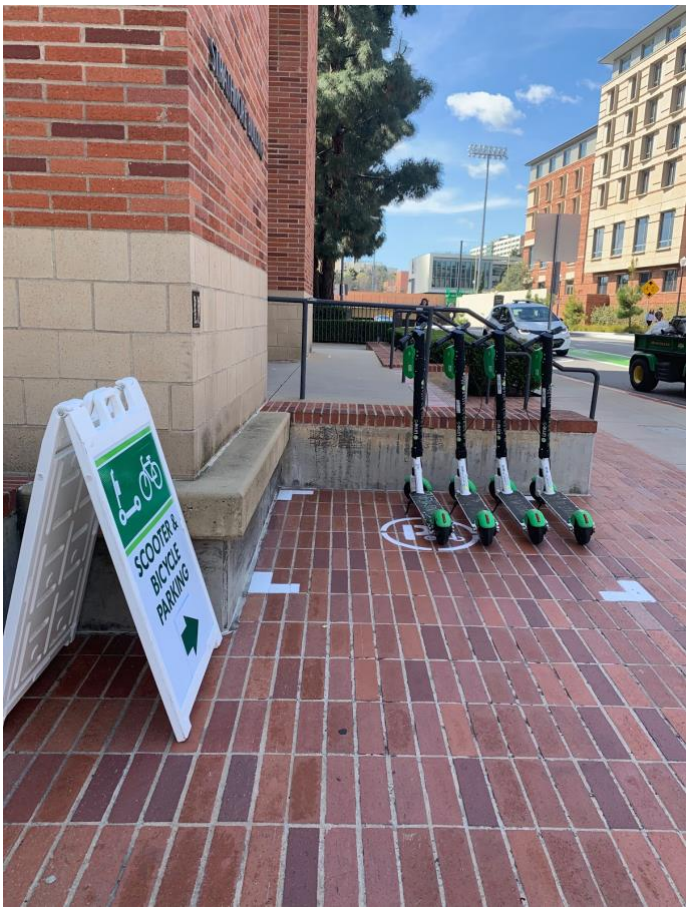
An a-frame sign close to the official parking location at Luskin Turnaround.

Appendix 3: Other signage related to e-scooter parking



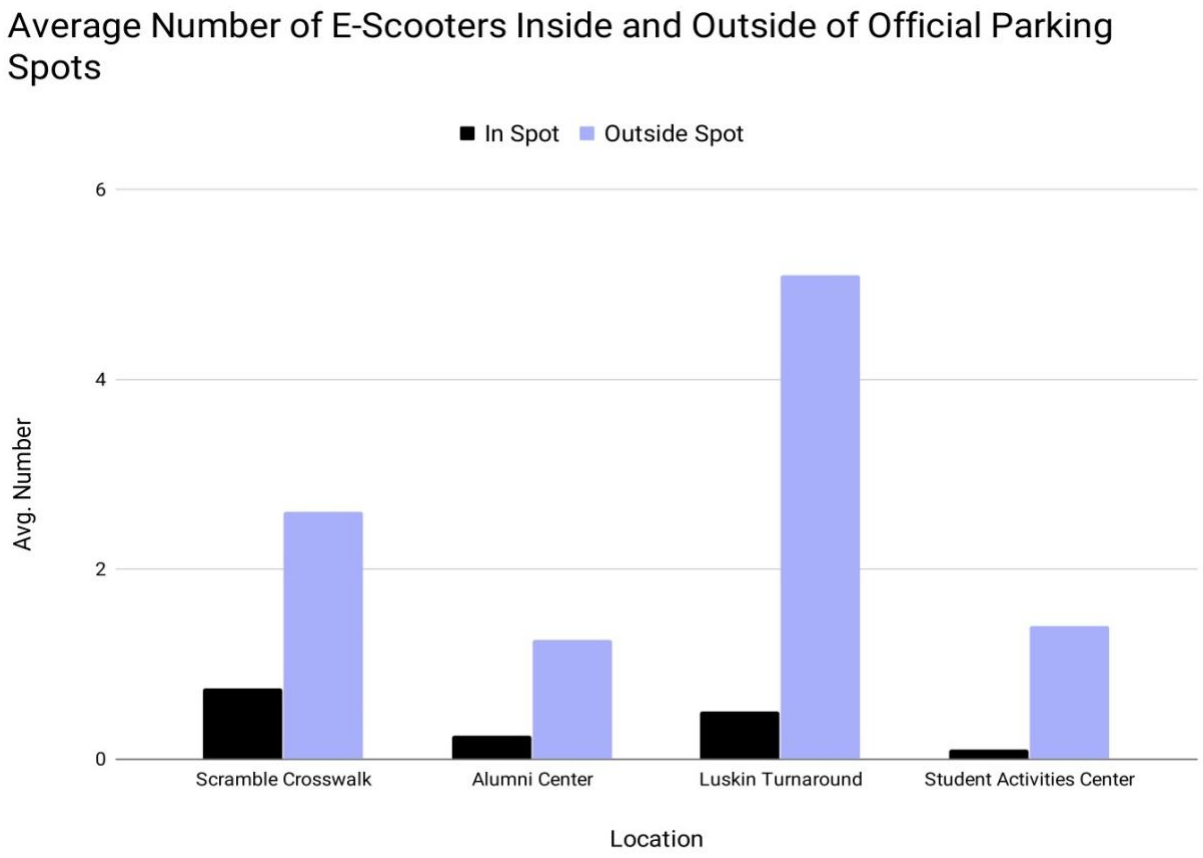
Signage telling riders to park electric scooters at the nearest bike rack and to not block walkways, ADA pathways, or stairs. Taken at the Boelter Stairs.

Appendix 4: Scooters dropped off after charging

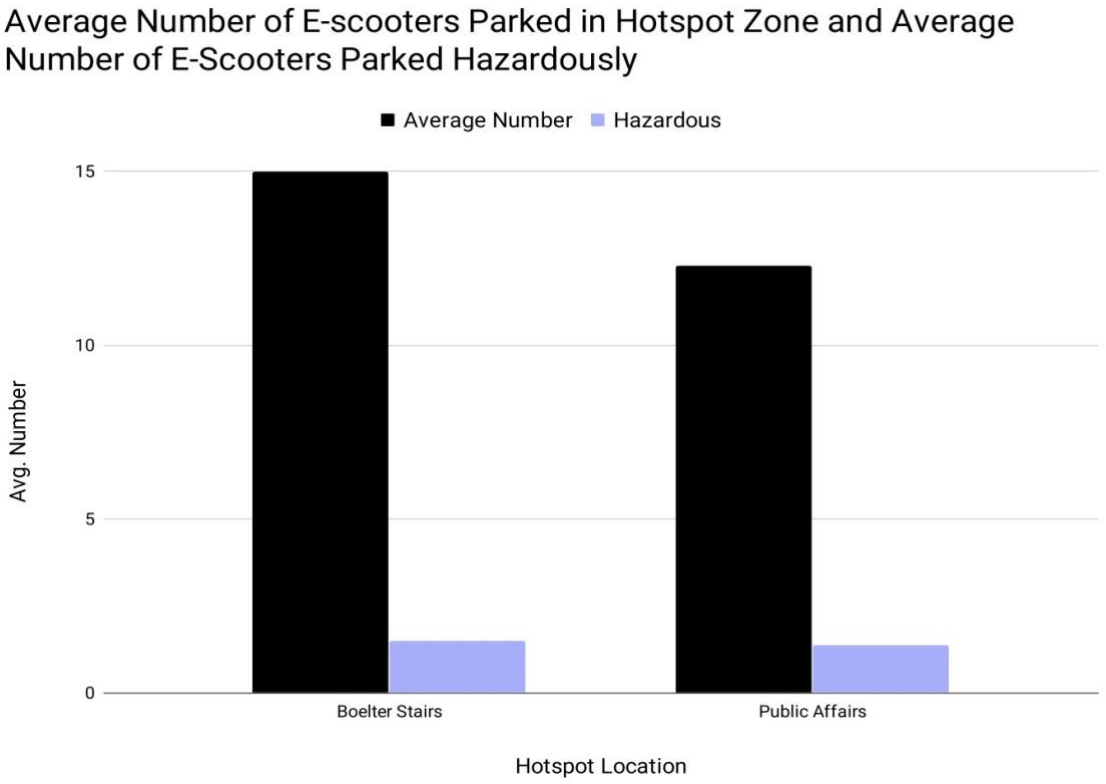


E-scooters parked in a uniform way, suggesting they were left by someone dropping them off after charging. Taken at the Scramble Crosswalk parking location.

Appendix 5: Spot count data

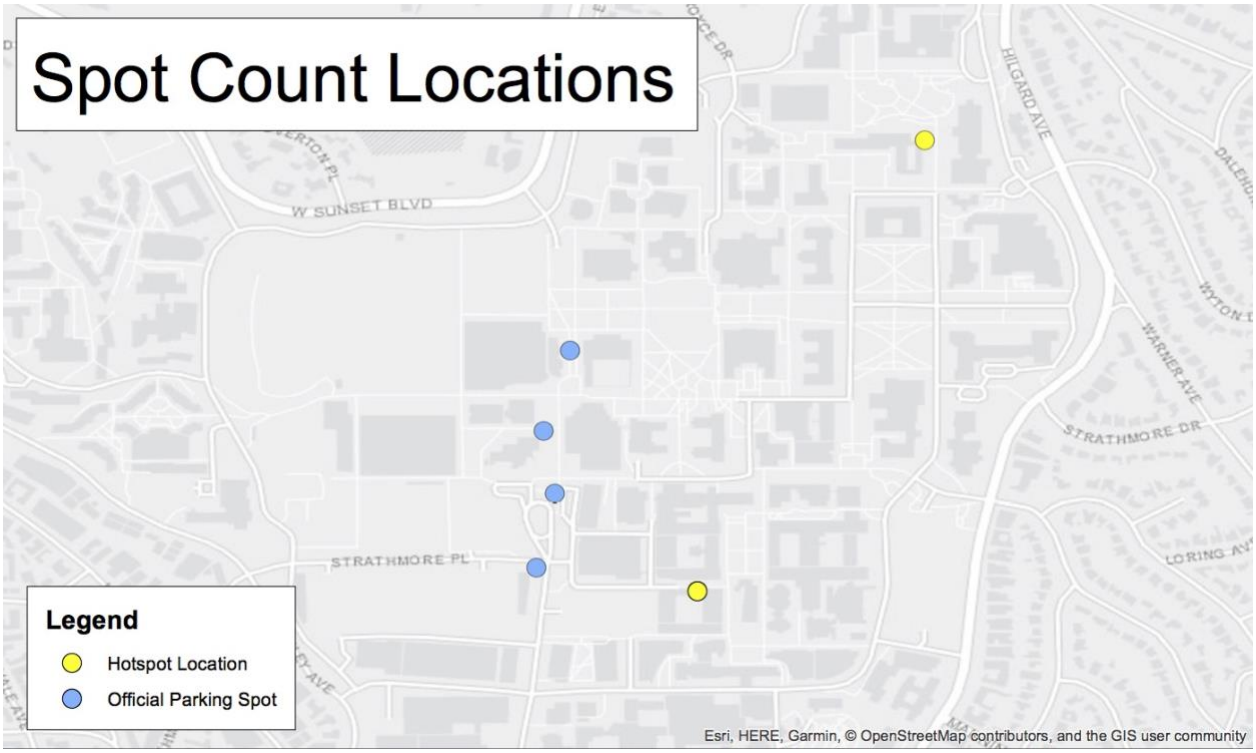


Here we can see that each parking spot had an average of less than .5 birds per spot count. The two parking spots that were used the most were the scramble crosswalk, and the Luskin Turnaround.



We can see the hotspots were used more frequently than the parking spot locations, with about 12 to 15 birds per spot count. The ratio of and number of birds parked hazardously is also higher in the hotspots when compared to the parking spot locations; however, the difference is not significant enough for us to consider the parking spots the reason behind this difference. There are other factors, like a limited number of available nonhazardous spots, that could skew this statistic in favor of the parking lot locations.

Appendix 6: Map of current parking and hotspot locations surveyed



The blue points on this map represent the current parking locations surveyed in our spot count data collection. The yellow points were also surveyed, and represent the locations which we deemed to be hotspots, with high e-scooter activity. As you can see, all four of the current parking locations are within the same vicinity on the way to campus on Westwood Plaza Blvd. The hotspot locations on the other hand, are either at (Public Affairs) or near (Boelter Stairs) specific campus buildings. As discussed above, because the hotspot locations represent popular destinations on campus, we feel more people are inclined to park at them, rather than the current designated spots on the way.

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